

Model Weed Law Provisions for Management of New Invaders, Rapid Response,
And Cost-Effective Allocation of Public Resources

Subtitle: Tiering Noxious Weed Lists to Invasion Stage

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Introduction

The most fundamental decision for noxious weed management is designating species for a state weed list. Existing state weed lists identify from one to 135 species as “noxious”¹. Some states have² or are moving toward tiered lists that group these species according to management priority, infestation range, or other parameters. Most state and provincial weed laws address weeds only after they become well established (North American Weed Management Association 2006). However, noxious weed lists tiered to invasion stage can guide allocation of scarce public resources to the management of prioritized noxious weeds, including those species that require a rapid response.

This white paper presents model weed law provisions that would allocate public resources based on invasion stage and facilitate the management of new invaders. Actual legislative wording may be written by states adopting these provisions. This manuscript provides citations to actual statutes enacted by various states. The National Invasive Species Information Center (NISIC) web site provides links to individual state statutes and rules for regulation of noxious weeds at <http://www.invasivespeciesinfo.gov/laws/statelaws.shtml>.

The strategic categorical management goals for listed weeds should be explicitly defined in the statute. The following management goal definitions are excised from Colorado 35-5.5-103:

- (a) "Eradication" which means reducing the reproductive success of a noxious weed species or specified noxious weed population in largely uninfested regions to zero and permanently eliminating the species or population within a specified period of time. Once all specified weed populations are eliminated or prevented from reproducing, intensive efforts continue until the existing seed bank is exhausted.
- (b) "Containment" which means maintaining an intensively managed buffer zone that separates infested regions, where suppression activities prevail, from largely uninfested regions, where eradication activities prevail.
- (c) "Suppression" which means reducing the vigor of noxious weed populations within

¹ Although all states have “pure seed” laws that regulate weed seed contamination of beneficial seed lots, only 37 states or southern tier Canadian provinces have terrestrial noxious weed laws that regulate the actual plants of non-aquatic weed species. The states and provinces that do not have terrestrial noxious weed laws are AL, CT, GA, IN, KY, LA, NB, MA, ME, MI, MS, NH, NJ, NS, NY, SC, TN, TX, VA, VT.

² 15 states or provinces have some type of multiple category noxious weed lists AB, AZ, CA, FL, IN, IA, MD, MN, MT, NC, OR, QU, WA, WV, WI.

an infested region, decreasing the propensity of noxious weed species to spread to surrounding lands, and mitigating the negative effects of noxious weed populations on infested lands. Suppression efforts may employ a wide variety of integrated management techniques.

The Invasion Process

The conceptual and documented history of plant invasions recognizes several stages in the geographic spread of introduced weeds (Figure 1 adapted from (Chippendale 1991; Hobbs and Humphries 1995)).

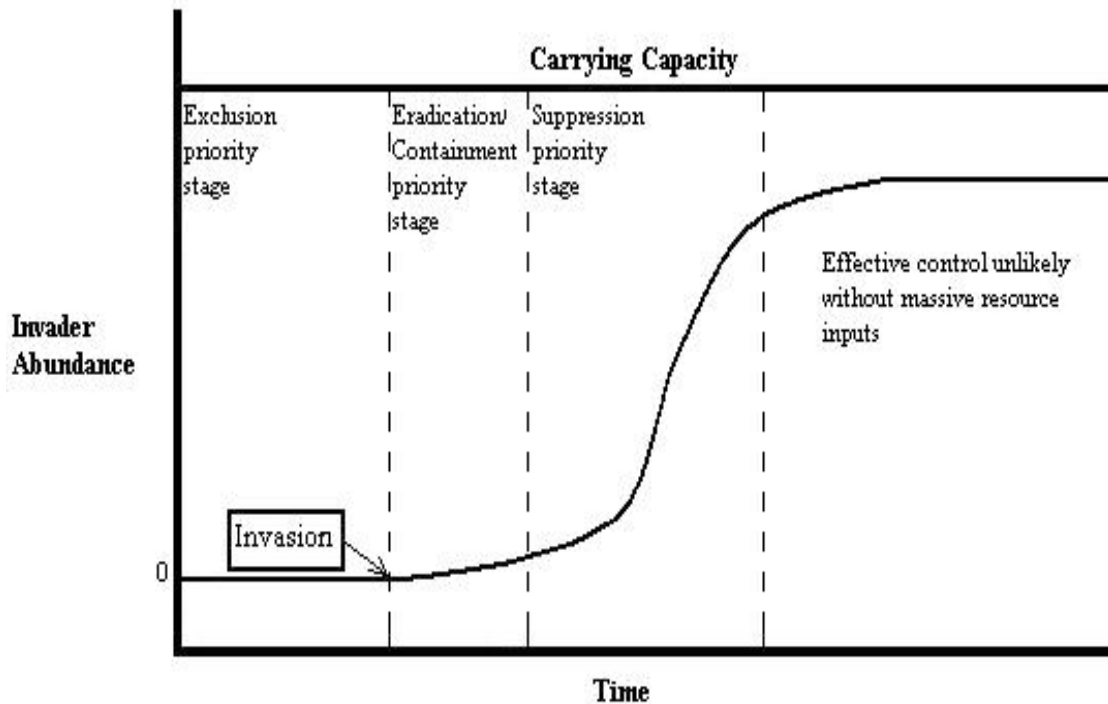


Figure 1- Different stages of invasion and management objectives for noxious weeds.

The classical neo-range spread model has four major four phases relevant to management strategies (Chippendale 1991; Hobbs and Humphries 1995). The initial intervention opportunity is the “exclusion stage” when introduction of the weed to a new geographic area may be prevented. It is widely accepted that this stage is the most cost-effective stage in which to manage weeds (Mack and others 2002; D’Antonio and others 2004). However, the legal authorities for state agency weed managers to enact strategies addressing this first stage are limited. Public education is one of the few options that agencies currently have to restrict new introductions.

Following initial establishment there is typically a lag phase before the weed begins to rapidly increase its geographic range. Attempting eradication is the priority

management strategy during this second “eradication priority” stage. Eradication of new invaders may not always be feasible with current management tools (primarily herbicide spraying and mechanical methods), but an aggressive and persistent attack at this stage can often at least contain the infested area to the existing acreage or even reduce acreage.

When the invasion process continues, the third or “suppression priority” stage is entered. Strategy shifts to spraying satellite colonies and entry points to yet uninfested areas (such as wilderness trailheads) while the core population is less intensively managed. The area of satellite colonies increases more rapidly than the perimeter of the core infestation, therefore, attacking the satellites is more effective in reducing the spread rate (Moody and Mack 1988). At some later point during this third stage it also becomes desirable to begin to shift control efforts primarily to sites with the highest value for conservation or production (Hobbs and Humphries 1995). Effective management of high-priority sites requires continued development and refinement of “multi-tool” integrated weed management techniques to obtain cost-effective, long-term suppression of weed species that cannot be easily controlled with herbicides alone.

Finally, at the fourth stage (“effective control unlikely without massive resource inputs”), the geographic breadth of the invasion is so extensive that only the highest priority sites can be controlled and more of the available resources need to be directed at biological control agents that, although they cannot eliminate a target weed from a site, may suppress its abundance across the landscape and reduce the reinfestation rate of the high-priority sites that are under intensive management.

There is now a broad consensus among public land managers to aggressively attack new invaders with the objective of eradication and directly manage the weeds that have saturated the landscape on only the highest-priority sites.

Model Law Provisions

The first element in the North America Weed Management Association (NAWMA) 2006 model weed law is “Landowner responsibility for noxious weed control.” Although most state noxious weeds laws require private landowners to pay the cost of noxious weed suppression on their lands there is a general tendency for states and particularly local government to not use the existing full authorities provided by their noxious weed law due in part to a lack of political will (Filbey and others 2002). Instead, they increase the level of public education and encourage voluntary participation such as forming Cooperative Weed Management Areas. In addition, from an economic or ecological standpoint, it is not feasible for any entity to implement large-scale chemical or cultural suppression of an invasive plant when it is in the latter stages of the invasion process. The public receives little net benefit from subsidizing direct suppression of widespread weeds on most private land, while the individual landowner may receive little net benefit from bearing the high cost of eradication of new invaders. This disparity in public and private fiscal interests has confounded effective management of new invaders. Accordingly, a policy that directs public resources toward new invaders should provide greater net benefit over the long term.

These model weed law provisions are based on invasion stage. They were developed after reviewing all North American state and provincial noxious weed statutes and rules, other model weed and invasive species laws, and conducting semi-structured interviews of 13 western state³ weed coordinators. The model provisions can be conceptually summarized as 11 primary topics:

1. Multi-Category Tiered List
2. State Rapid Response Funding Reserve
3. Quarantine Provisions for Emergency Listed Weeds
4. Permanent Noxious Listing By Rulemaking
5. Noxious Weed Advisory Panels
6. Compensation for Technical/Scientific Specialists
7. Open Petition for Listing and Technical Findings
8. Annual and Tri-annual Review of List
9. Explicit Authority to Downgrade Listing Category or Completely Delist
10. Warrant for Site Inspection
11. Mandated Review Every Three Years of State & County Management Plans

Multi-Category Tiered List

A comprehensive listing system would include eight categories that reflect the varied management objectives for weeds according to distributions in the state, relative abundances, impacts, and the feasibility of control at different spatial scales. These multiple listing categories would provide official guidelines for prioritizing and implementing noxious weed control activities and guide allocation of state funds for weed management projects. The jurisdictional entity responsible for implementation must be explicitly identified in the statute to preclude denial of responsibility.

Category Name	General Purpose
Watch Listed	Collect information on potentially invasive species
Exclusion by Quarantine	Prevent introduction from other states
Category 1	Eradicate or contain new invaders already in state
Category 2	Regionally abundant weeds
Category 2A	Eradicate or contain where less abundant
Category 2B	Suppress in region(s) where abundant
Category 3	Suppress statewide abundant weeds
Quarantined Beneficial	Contain established beneficial plants with invasive traits
Emergency	Allow rapid response until fully evaluated
County Listed	Weeds of local concern not listed by the state

Watch Listed: The state seeks additional information on potentially invasive species for which the distribution and regional invasive potential are not well known. These suspect species may be known to be already present in the state or only known to be in surrounding states. The State contacts adjoining states known to have these Watch Listed

³ AK, AZ, CA, CO, MN, MT, NE, NM, OR, SD, UT, WA, WY

weeds to obtain that state's current information. The state encourages research and surveys and monitoring spread of these plants, but there are no legal mandates or management restrictions. Washington and Montana are states that have implemented watch listing as policy although there is no provision in statute for this preventive management tool.

Exclusion by Quarantine: This category is for known invasive weeds not present in the state. The state identifies and mitigates future threats from these invasive plants which may include monitoring the presence of harmful invasive plants in neighboring states and determining their potential pathways of entry into the state. Only eight states actually have legal authorities that allow the identification and listing of weeds that could be state invasive weeds in the future (Filbey and others 2002). The state has mandated responsibility for maintaining exclusion via quarantine and educational mechanisms. Washington provides exclusion by quarantine example applied to purple nutsedge (*Cyperus rotundus*) in WAC 16-752-700 which cites supporting statutes.

Category 1: This category regulates new invaders that have a limited number of small infestations in the state. Eradication is mandated as the management goal (see WA Chapter 16-750 WAC) while recognizing that current control methods may only be sufficient to achieve containment. The state is responsible (has authority) at least in counties that do not have a weed program (see CO Cat A). The state sets rules and develops plans for management of these Category 1 weeds (CO 108.5). Control or eradication of a new invader (OR Cat 3) may be conducted by the state or county without charge to the owner or occupant of the land (see ORS 570,530(4)).

Category 2: For weed species that are abundant in some regions within the state but less abundant or absent in other regions, there are two sub-categories (see WA). A **Category 2A** listing mandates eradication or containment within regions where the weed is not yet well established. Public and private landowners are required to manage Category 2A weeds at their own expense. Agency landowners are required to have weed management plans. **Category 2B** listing mandates an "effective government program" in regions where the weed is already abundant. The concept of an effective program recognizes that the degree of invasion in that region has surpassed the level where neither eradication nor containment are feasible, but directed voluntary control efforts would provide benefits on high-value sites; and mandated biological control programs or indirect management strategies may provide some suppression at a landscape scale. Counties develop and implement the management plans for weeds designated as Category 2B in their region; however, the State takes the responsibility for eradicating/containing weeds in Category 2A (see CO).

Category 3: This category lists weeds that are widespread across the state and abundant enough to have significant negative impacts statewide. The statute does not mandate direct control by landowners (see CO 35-5.5-108). However an "effective state government program" is mandated and agency land owners are required to have weed management plans. The mandated state program emphasis and funding allocations are for biocontrols and educational efforts to help the public learn to identify and manage these

Category 3 weeds on sites with high value for conservation, recreation, or production. The state and counties provide technical and informational assistance to private entities who want to practice direct management. State funds are not used to subsidize direct management efforts of Category 3 weeds on private lands, but the state may allocate financial resources for demonstration projects on private lands.

What about neighbors who practice direct suppression of Category 3 weeds and those adjoining landowners who do not? This situational conflict often has been traditionally addressed by the landowner who practices control filing a complaint under the noxious weed law with the regulating entity. A separate misdemeanor nuisance statute could be used to resolve conflicts between adjacent landowners.

Quarantined Beneficial: This category is used for species already established in the state with widely recognized beneficial use but are emerging as problematic (such as Russian olive [*Elaeagnus angustifolia*]), or beneficial plants known as problematic but not feasible to control on most sites (such as reed canarygrass [*Phalaris arundinacea*]). The state statute does not mandate control but prohibits additional sale or transport. The management goal is to reduce the rate of anthropogenic spread without mandating removal by landowners who believe their established plantings provide them with a net individual benefit. Montana has added an administrative rule establishing a fourth listing category being applied to quarantine of Russian olive which had been widely planted for prairie shelterbelts.

Emergency: This category allows a rapid response by enabling states to list as temporarily “noxious” the weeds widely recognized as problematic (see NE, SD, UT, WA quarantine) The duration of Emergency listing is 18 months or two growing seasons; however, it could be one growing season if the lists are reviewed every year. After the period of Emergency listing allowed by the statute, the weed must be assigned to the most appropriate permanent category or delisted. To the extent possible, the development and applicability of each state emergency action plan should be coordinated with other affected states, federal agencies, tribal authorities, regional organizations, and local jurisdictions. Control or eradication of Emergency weeds may be conducted by the state or county without charge to the owner or occupant of the land.

County Listed: Individual counties may require management of state-listed Category 2B or Category 3 weeds in their jurisdiction if the local authority judges that it would provide a net benefit to that county as part of a countywide weed management plan. Individual counties may also add weeds not on the state list. Utah and Montana are examples of states within which Counties can list weeds of local concern not listed by the State.

State Rapid Response Funding Reserve

A State Rapid Response Funding Reserve (CO 35-5.5-116. (5)) in the amount of \$5,000 to \$50,000 is necessary for implementing a rapid response to new invaders designated by Emergency Listing or even listed as Category 1 weeds (SD 38-22-38 (3)). The “rapid response” could be implemented by the state and/or the state may grant

reserve funds to counties, cooperative weed management areas, or other entities (conservation organizations, watershed districts, etc.) depending on established division of responsibility and capability within the state, but the state should have the authority to implement rapid response independently. These State Rapid Response Funds are used for small-acreage targets (not newly listed extensive weeds) on private as well as public lands. Use of the South Dakota Weed and Pest Fund for actual control is restricted to public lands. There should not be a mandatory cost-share requirement.

Quarantine Provisions

Quarantine provisions may be written into statute to prevent the sale and intentional or inadvertent transport of Emergency-listed weeds (see ORS 570.530 (1)). Also quarantine provisions are needed for Category 1 weeds to prevent their additional entry into the state, intrastate movement of plants, and containment of initially infested sites (WA). If means for suppression are unsatisfactory, quarantine may be the only viable management tool to restrict additional spread until more effective direct control techniques can be developed. A number of state laws already have quarantine provisions in existing statutes that relate to sale or transport of invasive species, but these tend to be weak, slow, and cumbersome to implement.

Noxious Listing By Rulemaking

“Noxious” listing should be by departmental rulemaking (MT, CO, WA) rather than including weed lists in legislatively enacted statutes. Embedding the lists of noxious weeds in statute prevents rapid response to new invaders and greatly encumbers the periodically needed adjustments in weed categories. Legislative staff does not have current ecological, distribution, and other technical knowledge to maintain relevant noxious weed lists in appropriate categories. The agriculture or natural resource departments of many states also are too small to have the spectrum of specialized expertise needed to independently construct and maintain the state weed lists, but these agencies should take the lead in the rulemaking process. Also a state government department typically does not have the breadth of political support to obtain wide concurrence for unilateral list-making. In Utah it has been proposed that the state Department of Agriculture declare the species on that state weed list as an administrative (policy) decision, but this approach, although potentially most expedient and least costly, is likely to have less transparency than a formal rule making process. A well constituted noxious weed advisory panel can provide the depth of technical expertise and breadth of political acceptance for species selected to add to the state lists.

Noxious Weed Advisory Panel

A Noxious Weed Advisory Panel with two independent subcommittees for advising the state on permanent listings can facilitate appropriate listings and garner wide concurrence from diverse stakeholders. Listing recommendations from a fact-finding technical committee are passed to a committee of social/economic stakeholders. The Montana noxious weed listing process incorporates these two spheres of knowledge and influence.

The technical and scientific specialists evaluate proposed new weeds and make preliminary category listing with transparent documentation -- that is, complete a risk assessment. The purpose of this technical subcommittee is to develop and analyze the scientific findings, economic impacts, and other criteria to evaluate what taxa should be added to or removed from the state list. Specific technical and scientific specialists are appointed by the director of the lead state agency, but the statute requires certain appointments (or designees) from state-funded agencies such as the Extension Service, as well as a broader pool of experts.

The stakeholders subcommittee determines statewide level of support for listing individual species. Identified by statute, stakeholder groups might include general industry, horticulture, conservation groups, tribes, counties, small and large private landowners, etc. The statute-identified groups recommend their representatives. The specific staggered appointments are made by the Governor or lead state agency. The stakeholder appointees are volunteers and are not paid for their service

Compensation for Technical/Scientific Specialists

Compensation should be available for technical or scientific specialists who are not federal agency employees or statute-designated state employees and to support extraordinary scientific review and assembly of factual information by statute-designated state employees or other specialists. This compensation is intended to insure rapid response and fully considered input. Useful risk assessment requires extended effort to gather and evaluate the available facts and weigh the multitude of uncertainties. It is insufficient for appointees to simply attend a panel meeting and issue a judgment without significant preparation. Payment for non-agency advisors should also insure more timely fact-finding as opposed to waiting indefinitely until a volunteer finds the extra time to collect and collate facts and develop a fully informed position.

State employees with relevant “pre-paid” job descriptions could be listed in the statute as specific members of the technical review group who do not receive special compensation.

Travel money should also be provided for technical specialists not funded by government and to cover travel expenses for statute-designated state employees if their agency cannot support that expense.

Petition for Listing and Technical Findings

Any individual or entity can petition the state to list new weeds and the state must then provide written technical findings supporting a decision to list or not list the proposed species. The petitioner should provide initial written rationale for listing the proposed weed (see <http://www.nwcb.wa.gov/get-involved>). The formal criteria for listing include the following subjects:

1. Is the proposed noxious weed non-native to the state?
2. What is the likelihood of introduction?
3. What is the current distribution in surrounding states and within the state?

4. Is the weed invading relatively undisturbed sites or reducing yield of crops that are receiving accepted cultural practices? The statute should preclude listing of ruderals that are controlled by standard agricultural or site-management practices.
5. What habitats are at risk?
6. What is the potential for the weed to naturalize (an estimate of potential maximum range and abundance)?
7. Has the species been problematic elsewhere in the world? Has it been listed as a legally declared noxious weed?
8. What are the potential ecological, human health, or economic impacts?
9. What is the feasibility of control (exclusion, eradication, containment, suppression)?
10. Summarize the basic biology and ecology for the proposed noxious weed.

The state must issue written findings for each proposed weed upon completion of the assessment process by the Noxious Weed Advisory Panel (see WA 17.10.074(4)). These findings include a summary of the available scientific information on the species, including but not limited to information on the plant's life history, distribution, potential ecological, economic, or human health impacts, methods of control, potential impacts of listing, and additional considerations. The state also considers multi-state (regional) coordination in its decision.

Annual and Tri-annual Review of List

The statute should mandate the state to annually request listing petitions, evaluate, and provide findings for proposed new listings, and annually review the Exclusion by Quarantine category and Watch List. All other list categories must be reviewed at least every third year (CO).

New petition findings and rulemaking must be completed within one year or before the next spring growth period. An appropriate sequential step time line is detailed by the Washington State Noxious Weed Control Board at <http://www.nwcb.wa.gov/printable-noxious-weed-list>. The statute embodied time line may allow for one growing season to pass during the review process so more complete information on actual in-state distribution may be collected. If the state has an Emergency listing category, it might not be necessary to complete permanent listing before the ensuing growing season.

Explicit Authority to Downgrade Listing Category or Completely Delist

The statute should provide the lead state department with explicit authority to change listing category, including downgrading or completely delisting a species.

Warrant for Site Inspection

The statute should include a provision for issuing a warrant after due notice to facilitate more rapid access for inspection of private property suspected to be infested with a new invader. This is a limited entry to check for a specific "imminent threat" (CO 35-5.5-108.5.(5)). The warrant is issued by a municipal, county, or district court with jurisdiction over the land. Such limited regulatory inspections are not the same as

searches and do not require “probable cause.” The statute should also include a parallel provision to allow the state or county to initiate eradication if the landowner does not cooperate with the management plan for that weed. For example, CO 35-5.5-108.5 attempts to balance private property rights with public benefit of rapid response.

Mandated Review Every Three Years of State & County Management Plans

The statute should mandate review every three years of the state or county management plans for Category 1 and Category 2A weeds. This review is conducted by the two advisory subcommittees of the Noxious Weed Advisory Panel.

In General

States should focus on new invaders and potential new invaders with mandated responsibility for attempting eradication, containment, or exclusion. Counties are responsible for widespread weeds but the State may use funding mechanisms to contract with counties or alternative entities (municipalities, cooperative weed management areas, conservation groups, etc.) to fulfill the state’s legal responsibility for managing new invaders. In states where counties do not have weed control entities, the state program for Category 2 and 3 (abundant) weeds should attempt to encourage formation of alternative entities. Formally mandating accountability to the state or counties for implementation is essential to avoid denial of responsibility.

Conclusions

As the threat of invasive weeds becomes more urgent and widely recognized, an increasing number of states are writing or updating comprehensive weed management statutes, rules, and regulations. The invasion stage of species is one factor by which states can organize and prioritize weed lists. Organizing by invasion stage emphasizes rapid response to new invaders which has been shown to be more cost-effective than prolonged management of widespread species. Only ten governments currently have noxious weed lists tiered in any degree to invasion stage.

The Federal government’s National Invasive Species Management Plan (<https://www.doi.gov/sites/doi.gov/files/uploads/2016-2018-nisc-management-plan.pdf>) is generally organized by invasion stage with sections on “Prevention” as the first defense, “Early Detection and Rapid Response” to new invaders, and “Control and Management” of widespread species. However, the National Governors Association (NGA) recognized the states’ unique opportunity to work through state and local governments and with the general public to detect new invaders. In a 2007 Policy Position, NGA recommended that states “prepare and implement targeted and integrated management measures for the prevention, early detection, and eradication or control of invasive species, including emergency response efforts to eradicate the first footholds of invasive species that are not yet firmly established in a region”

The provisions discussed in this whitepaper may be adopted to build or modernize a state noxious weed law to more effectively manage new invaders. Creating or changing state weed legislation is likely to require a long-term, multi-year effort. Wisconsin is a state where during much of this decade stakeholders have been considering adapting an invasion stage tiered list for noxious weeds (Klein 2004). Often social, political, or economic issues must be considered along with biological factors such as a species' invasion stage. However, the more that science can inform policy, the more likely it is that our nation's natural and agricultural resources can be protected and maintained.

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